

REMARKS

Claims 1 to 19 are pending in the application. Three new independent claims 17 to 19 have been presented and claims 5 and 12 have been rewritten in independent form so that a total of six independent claims are presented with the instant amendment. Please charge the **required fee for three extra independent claims in the amount of 3 x \$200.00 = \$600.00** to credit card. PTO-2038 is attached.

Rejection under 35 U.S.C. 102

Claims 1-4, 9-11, 13-16 stand rejected under 35 U.S.C. 102(b) as being anticipated by *Bartholomaus (U.S. 4,491,153)*.

The present invention relates to a valve for a camshaft adjusting device. Such camshaft adjusting devices entail the problems that the adjusting element, in the form of a piston or a rotor, will not properly and optimally clamp hydraulically the adjusting element when leakage occurs. Moreover, it is a problem that, when oil pressure is insufficient in one of the pressure chambers of the adjustor, the locking mechanism no longer can be released (see paragraphs 0004 to 0006 of the instant specification).

The present invention therefore is concerned with designing a valve for a camshaft adjusting device in such a way that the adjusting element can be optimally hydraulically clamped and the locking mechanism of the adjusting element can be released anytime in a reliable fashion.

The cited prior art reference U.S. 4,491,135 concerns a pressure reducing valve, see col. 1, line 38ff. Such pressure reducing valves can move the plunger 13 of the proportional solenoid valve 14 with a minimal solenoid force by pressure compensation via two restrictors 9, 11 of predetermined diameter. This configuration is provided so that the hydraulic force is acting on the piston in the same direction as the force exerted by the proportional solenoid (see col. 1, lines 62 ff; see col. 3, lines 44-57; see col. 5, lines 7-15). The hydraulic force is created by intermediate pressure between the two restrictors 9, 11 wherein the intermediate pressure is greater than the pressure in the supply tank and lower than the control pressure. As a result of the intermediate pressure acting in the same direction as the solenoid force, the solenoid force provided by the proportional solenoid

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valve for moving the plunger can be reduced in comparison to conventional pressure reducing valves.

The prior art configuration and design are aimed at solving a different problem than the present invention. According to the present invention, the valve is configured to clamp the adjusting element of a camshaft adjuster in an optimal way and to ensure that the locking mechanism can be released at any time.

In the cited prior art patent, leakage is generated deliberately by means of the restrictors 11 and the connecting bore 12 in order to provide pressure compensation. Moreover, the prior art pressure reducing valve has only a single working connector A where only a reduced pressure is present. The pressure reducing valve is thus a three-way valve while the valve according to the present intention is a four-way valve. Both valves differ in principle from one another. According to the present invention the leakage of the camshaft adjusting system that occurs is counteracted in that the pressure connector is connected by at least one leakage passage to the working connector at all times. The leakage loss of the system is compensated so that sufficient pressure is available. This is in contrast to the prior art device where leakage to the tank T is increased artificially by the restrictors 9, 11 in order to provide a hydraulic force acting on the plunger.

New claim 17 corresponds essentially to claim 1 but claims two working connectors instead of at least one working connector. The arguments presented above in regard to claim 1 apply therefore also to claim 17.

Reconsideration and withdrawal of the rejection of the claims pursuant to 35 USC 102 are therefore respectfully requested.

New Claims 18 and 19

Claim 18 relates to a camshaft adjusting device for motor vehicles comprising an adjuster and a proportional solenoid valve for actuating the adjusting element of the adjuster. The proportional solenoid valve comprises a valve housing provided with at least one working connector, a tank connector, and a pressure connector. The proportional solenoid valve has a piston movably arranged in the valve housing. The pressure connector supplies a pressure medium into the piston that has at least one passage for the pressure medium. One or more leakage passages connect the pressure connector at all

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times to the at least one working connector for hydraulically clamping the adjusting element. Claim 19 essentially corresponds to claim 18 but is limited to two working connectors.

ALLOWABLE SUBJECT MATTER

Claims 5-8 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 5 has been amended to include the features of claims 1 and 4 and should thus be allowable with its dependent claims 6-8.

Claim 12 has been amended by incorporating therein the features of claims 1 and 11 and should thus be allowable.

Information Disclosure Statement

An information Disclosure Statement has been filed electronically on 8/30/2005. The reference U.S. 4,537,164 is viewed by the EPO as category "X" and U.S. 5,747,105 is viewed as category "Y"; the other references are considered technological background only (category "A").

In regard to U.S. 4,537,164, applicant would like to submit that the disclosed device does not relate to camshaft adjusting apparatus but concerns an actuating apparatus for an internal combustion engine. The actuating apparatus has a spool 11 with bypass 11c connecting the pressure connector (oil inlet port) 10b to the working connector (oil outlet port) 10c. According to col. 4, lines 21-31, the bypass 11c simply has the task to convey hydraulic oil to the actuator 5 in a quantity that is small enough not to actuate the actuator 5 but large enough to eliminate air that may be present within the oil path 5b. The bypass 11c therefore has an entirely different task in comparison to the leakage bores 20, 21 of the present invention.

The device according to the U.S. patent is a variable valve drive and no camshaft adjuster. For this reason, a person skilled in the art concerned with improving a camshaft adjusting device would not look for solutions relating to camshaft adjusting devices in a variable valve drive. The U.S. patent only teaches a bypass line 11c used for supplying hydraulic oil in order to eliminate air from the oil path 5b. It is not apparent how this

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teaching could be applied by a person skilled in the art to solving the problem of optimally clamping an adjusting element of a camshaft adjusting device and ensuring proper release of the locking mechanism of the camshaft adjusting device. It is not obvious to use such an air-purging bypass line 11c as disclosed in the U.S. patent for hydraulically clamping an adjusting device as there is no motivation or suggestion to do so. Moreover, the U.S. patent is not concerned with camshaft adjusting devices so that a person skilled in the art would not even consider this reference as being relevant.

In regard to U.S. 5,474,105, applicant would like to submit that this reference also cannot provide any teaching leading to the inventive solution. This reference does not concern a camshaft adjusting device but a device for limiting pneumatic fluid flow as disclosed in col. 1, lines 5-13. The device is designed to prevent that the apparatus operated with the pneumatic medium, for example, piston pumps, are damaged by pneumatic pressure that is too high. For this purpose, the device has a valve piston 120 having an axial orifice 125 at its bottom. A small amount of pressure medium (col. 3, lines 22-30) flows through this axial bore 125 in order to provide pressure compensation at both sides of the piston once the pressure fluid driven device is shut off and the ports 122 are closed off by the edge of land 130 of the labyrinth seal with rings 121. With this measure it is achieved that the piston 120 is reset automatically and reliably from the closed position into the open position.

This reference has nothing to do with a camshaft adjusting device and also does not concern the aforementioned problem of hydraulically clamping the adjusting element and providing for proper release of the locking mechanism. This reference belongs to a different field of the art and therefore could not provide any motivation to a person skilled in the art to configure the camshaft adjusting device in the way proposed with the present invention.

CONCLUSION

In view of the foregoing, it is submitted that this application is now in condition for allowance and such allowance is respectfully solicited.

Should the Examiner have any further objections or suggestions, the undersigned would appreciate a phone call or e-mail from the examiner to discuss appropriate

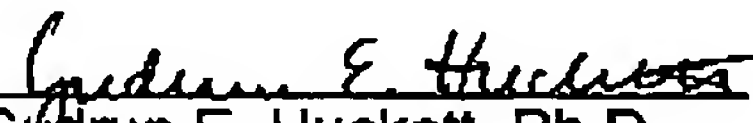
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amendments to place the application into condition for allowance.

Authorization is herewith given to charge any fees or any shortages in any fees required during prosecution of this application and not paid by other means to Patent and Trademark Office deposit account 50-1199.

Respectfully submitted on August 31, 2005.


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Encl.: time extension petition (1 sheet): PTO-2038 (1 sheet)

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